

APPARATUS FOR PERFORMING HEAT-EXCHANGING, CHEMICAL REACTIONS

5 **ABSTRACT OF THE DISCLOSURE**

The present invention provides an apparatus for performing heat-exchanging chemical reactions, such as nucleic acid amplification. The apparatus includes a reaction vessel having a chamber for holding a sample for chemical reaction and optical detection. The vessel has a rigid frame defining the side walls of the chamber, and flexible sheets attached to opposite sides of the frame to form opposing major walls of the chamber. The frame further includes a port and a channel connecting the port to the chamber. The temperature of the sample is controlled by opposing plates positioned to receive the chamber of the vessel between them. The apparatus also includes a plunger which is inserted into the channel of the vessel to seal the port and increase pressure in the chamber. The increased pressure forces the flexible major walls of the chamber to contact and conform to the surfaces of the plates, thus ensuring optimal thermal conductance between the plates and the chamber. The apparatus also includes thermal elements for heating or cooling the plates, as well as optics for detecting analytes in the sample.

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